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Refer to the MicroLogix Selector Guide on the back cover of this publication for assistance in selecting the correct MicroLogix Programmable Controller for your application.

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MicroLogix 1000 Family

Based on the architecture of the market-leading SLC™ 500, the MicroLogix 1000 brings blazing speed, powerful instructions, and flexible communications to applications that demand compact, cost-effective solutions.

All MicroLogix 1000 Programmable Controllers that have 24V dc inputs include a built-in high-speed counter (6.6k Hz) that is one of the most functional in the industry.

The high-speed counter allows you to capture pulses from high-speed devices such as encoders and PHOTOSWITCH® products, independent of the controller's program scan, and energize outputs accordingly.

The MicroLogix 1000 Programmable Controller is available in 10-point, 16-point, or 32-point versions.

Analog versions are also available with 20 discrete I/O points and 5 analog I/O points.

The analog I/O circuitry for the MicroLogix 1000 units is embedded into the base controller, not accomplished through add-on modules. So, it provides very high-speed, cost-effective analog performance.

Because it has 16-bit resolution, it enables precise measurement and control of process variables, such as temperature, pressure, and flow.

Features

- Peer-to-peer messaging capability. Allows you to network up to 32 controllers using the AIC+.
- RTU slave protocol support. DF1 Half-Duplex allows up to 254 slave nodes to communicate with a single master using radio modems, leased-line modems, or satellite uplinks.
- Built-in EEPROM memory. Retains all of your ladder logic and data if your controller loses power, eliminating the need for battery backup or separate memory module.
- Fast throughput. Allows for typical throughput time of 1.5 ms for a 500-instruction program.
- Multiple input and output commons. Allows you to use the controller for either sinking or sourcing input devices and for multi-voltage output applications.
- Bi-directional high-speed counter. Offers real-time output response independent of the program scan that accepts a 6.6kHz input signal.
- Adjustable DC input filters. Allows you to customize your input response time and noise rejection to meet your application needs.
- RS-232 communication channel. Allows for simple connectivity to a personal computer.
- UL listed and C-UL (Canada) Certified, Class 1, Division 2
- CE compliant

Available Controllers

Catalog Number	Input Type	Output Type	Power	Number of Inputs	Number of Outputs	Analog
1761-L16AWA	AC	Relay	AC	10	6	n/a
1761-L32AWA	AC	Relay	AC	20	12	
1761-L20AWA-5A	AC	Relay/Analog	AC	12	8	4 inputs, 1 output
1761-L10BWA	DC	Relay	AC	6	4	n/a
1761-L16BWA	DC	Relay	AC	10	6	
1761-L20BWA-5A	DC	Relay/Analog	AC	12	8	4 inputs, 1 output
1761-L32BWA	DC	Relay	AC	20	12	n/a
1761-L10BWB	DC	Relay	DC	6	4	
1761-L16BWB	DC	Relay	DC	10	6	
1761-L20BWB-5A	DC	Relay/Analog	DC	12	8	4 inputs, 1 output
1761-L32BWB	DC	Relay	DC	20	12	n/a
1761-L16BBB	DC	MOSFET/Relay(1)	DC	10	6	
1761-L32BBB	DC	MOSFET/Relay(1)	DC	20	12	
1761-L32AAA	AC	Triac/Relay(1)	AC	20	12	

(1) Two isolated relays per unit.

For detailed information on the MicroLogix 1000 controllers, refer to the MicroLogix 1000 Programmable Controllers User Manual, publication 1761-6.3. To purchase this manual or download a free electronic version, visit us at http://www.theautomation bookstore.com. For fast access to related publications, visit the MicroLogix Internet site http://www.ab.com/micrologix. Electronic versions of our manuals are available for you to search and download.

MicroLogix 1000 Programmable Controllers Specifications

The following tables summarize the specifications for the controllers.

General Specifications

Description:		Specification: 1761-L												
		16AWA	20AWA-5A	32AWA	10BWA	16BWA	20BWA-5A	32BWA	32AAA	16BBB	10BWB	16BWB	20BWB-5A	32BWB	32BBB
Memory Size and Type		1 K EEPROM (approximately 737 instruction words: 437 data words)													
Data Elements		512 internal bits, 40 timers, 32 counters, 16 control files, 105 integer files, 33 diagnostic status													
Throughput		1.5 ms (for a 500-instruction program)(1)													
Programming Instructions		69 total (12 basic logic, 43 applied control, 14 advanced application-specific)													
Power Supply Voltage		85-264V ac, 47-63 Hz								20.4 - 26.4V dc					
Power Consumption	120V ac	15 VA	20 VA	19 VA	24 VA	26 VA	30 VA	29 VA	16 VA	Not Applicable					
	240V ac	21 VA	27 VA	25 VA	32 VA	33 VA	36 VA	36 VA	22 VA						
	24V dc	Not Applicable								5W			10W		7W
Power Supply Max Inrush Current		30A for 8 ms								30A for 4 ms			50A for 4 ms		30A for 4 ms
24V dc Sensor Power (V dc at mA)		Not Applicable			200 mA				Not Applicable						
Max Capacitive Load (User 24V dc)					200 µF										
Power Cycles		50,000 minimum													
Operating Temp.		Horizontal mounting: 0°C to +55°C (+32°F to +131°F) for horizontal mounting Vertical mounting(2): 0°C to +45°C (+32°F to +113°F) for discrete; 0°C to +40°C (+32°F to +113°F) for analog													
Operating Humidity		5 to 95% noncondensing													
Vibration		Operating: 5 Hz to 2k Hz, 0.381 mm (0.015 in.) peak to peak/2.5g panel mounted(3),1hr per axis Non-Operating: 5 Hz to 2k Hz, 0.762 mm (0.030 (in.)peak to peak/5g, 1hr per axis													
Shock		Operating: 10g peak acceleration (7.5g DIN rail mounted)(4) (11±1 ms duration) 3 times each direction, each axis Non-Operating: 20g peak acceleration (11±1 ms duration), 3 times each direction, each axis													
Agency Certification (when product or packaging is marked)		C-UL Class 1, Division 2, Groups A, B, C, D certified UL listed (Class 1, Division 2 Groups A, B, C, D certified) CE marked for all applicable directives													
Terminal Screw Torque		0.9 N-m maximum (8.0 in.-lbs)													
Electrostatic Discharge		IEC801-2 at 8K V													
Radiated Susceptibility		IEC801-3 at 10 V/m, 27 MHz - 1000 MHz, 3V/m, 87 MHz - 108 MHz, 174 MHz - 230 MHz, and 470 MHz - 790 MHz													
Fast Transient		IEC801-4 at 2K Power Supply, I/O; 1K V Comms													
Isolation		1500V ac													

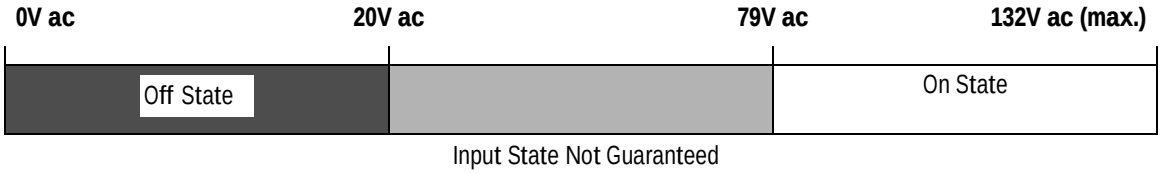
(1) A typical program contains 360 contacts, 125 coils, 7 timers, 3 counters, and 5 comparison instructions.
(2) DC input voltage derated linearly from 30°C (30V to 26.4V).
(3) DIN rail mounted controller is 1g.
(4) Relays are derated an additional 2.5g on 32 pt. controllers.

General Input Specifications

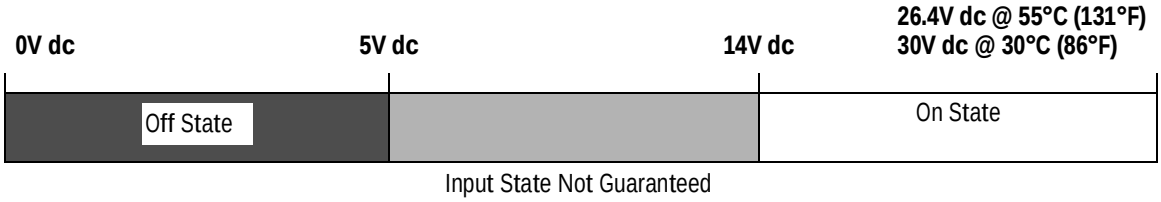
Description	Specification	
	100-120V ac Controllers	24V dc Controllers
Voltage Range	79 to 132V ac, 47 to 62 Hz	14 to 30V dc
On Voltage	79V ac min. 132V ac max.	14V dc min. 24V dc nominal 26.4V dc max. at +55°C (+131°F) 30.0V dc max. at +30°C (+86°F)
Off Voltage	20V ac	5V dc
On Current	5.0 mA min. at 79V ac 47 Hz 12.0 mA nominal at 120V ac 60 Hz 16.0 mA max. at 132V ac 63 Hz	2.5 mA min. at 14V dc 8.0 mA nominal at 24V dc 12.0 mA max. at 30V dc
Off Current	2.5 mA max.	1.5 mA max.
Nominal Impedance	12K ohms at 50 Hz 10K ohms at 60 Hz	3K ohms
Inrush Maximum	250 mA max.(1)	Not Applicable

(1) To reduce the inrush maximum to 35 mA, apply a 6.8K ohm, 5W resistor in series with the input. The on-state voltage increases to 92V ac as a result.

Input ac Voltage Range



Input dc Voltage Range



General Output Specifications

Description	Specifications		
Type	Relay	MOSFET	Triac
Voltage	See wiring diagrams on page 22.		
Max. Load Current	Refer to the Relay Contact Rating Table.	1.0A per point at +55°C (+131°F) 1.5A per point at +30°C (+86°F)	0.5A per point at +55°C (+131°F) 1.0A per point at +30°C (+86°F)
Min. Load Current	10.0 mA	1 mA	10.0 mA
Current per Controller	1440 VA	3A for L16BBB 6A for L32BBB	1440 VA
Current per Common	8.0A	3A for L16BBB 6A for L32BBB	Not Applicable
Max. Off State Leakage Current	0 mA	1 mA	2 mA at 132V ac 4.5 mA at 264V ac
Off to On Response	10 ms max.	0.1 ms	8.8 ms at 60 Hz 10.6 ms at 50 Hz
On to Off Response	10 ms max.	1 ms	11.0 ms
Surge Current per Point	Not Applicable	4A for 10 ms(1)	10A for 25 ms(1)

(1) Repeatability is once every 2 seconds at +55°C (+131°F).

Analog Input Specifications

The two voltage inputs accept ±10.5V dc. The two current inputs accept ±21 mA.

Description	Specification
Voltage Input Range	-10.5 to +10.5V dc - 1LSB
Current Input Range	-21 to +21 mA - 1LSB
Type of Data	16-bit signed integer
Input Coding -21 to +21 mA - 1LSB, -10.5 to +10.5V dc - 1LSB	-32,768 to +32,767
Voltage Input Impedance	210K Ω
Current Input Impedance	160 Ω
Input Resolution(1)	16 bit
Non-linearity	< 0.002%
Overall Accuracy 0°C to +55°C	±0.7% of full scale
Overall Accuracy Drift 0°C to +55°C (max.)	±0.176%
Overall Accuracy at +25°C (+77°F) (max.)	±0.525%
Voltage Input Overvoltage Protection	24V dc
Current Input Overcurrent Protection	±50 mA
Input to Output Isolation	30V rated working/500V test 60 Hz/1s
Field Wiring to Logic Isolation	

(1) The analog input update rate and input resolution are a function of the input filter selection.

Analog Output Specifications

The analog output can be configured for either voltage (0V dc to +10V dc) or current (+4 to +20 mA).

Description	Specification
Voltage Output Range	0 to 10V dc -1LSB
Current Output Range	4 to 20 mA - 1LSB
Type of Data	16-bit signed integer
Non-linearity	0.02%
Step Response	2.5 ms (at 95%)
Load Range - Voltage Output	1K Ω to ∞ Ω
Load Range - Current Output	0 to 500 Ω
Output Coding 4 to 20 mA - 1 LSB, 0 to 10Vdc - 1LSB	0 to 32,767
Voltage Output Miswiring	can withstand short circuit
Current Output Miswiring	can withstand short circuit
Output Resolution	15 bit
Analog Output Settling Time	3 msec (maximum)
Overall Accuracy 0°C to +55°C	±1.0% of full scale
Overall Accuracy Drift 0°C to +55°C (max.)	±0.28%
Overall Accuracy at +25°C (+77°F) (max.) - Current Output	0.2%
Field Wiring to Logic Isolation	30V rated working/500V isolation

Relay Contact Rating Table (applies to all Bulletin 1761 controllers)

Maximum Volts	Amperes		Amperes Continuous	Voltamperes	
	Make	Break		Make	Break
240V ac	7.5A	0.75A	2.5A	1800 VA	180 VA
120V ac	15A	1.5A			
125V dc	0.22A(1)		1.0A	28 VA	
24V dc	1.2A(1)		2.0A	28 VA	

(1) For dc voltage applications, the make/break ampere rating for relay contacts can be determined by dividing 28 VA by the applied dc voltage. For example, 28 VA/48V dc = 0.58A. For dc voltage applications less than 48V, the make/break ratings for relay contacts cannot exceed 2A. For dc voltage applications greater than 48V, the make/break ratings for relay contacts cannot exceed 1A.

Input Filter Response Times (Discrete)

The input filter response time is the time from when the external input voltage reaches an on or off state to when the micro controller recognizes that change of state. All controllers with dc inputs have configurable input filter response times.

The higher you set the response time, the longer it takes for the input state change to reach the micro controller. However, setting higher response times also provides better filtering of high frequency noise.

You can apply a unique input filter setting to each of the three input groups:

- 0 and 1 (30 Hz to 6.6 kHz)
- 2 and 3 (30 Hz to 6.6 kHz)
- 4 to x (30 Hz to 1.0 kHz) (x equals 9 for 16 I/O controllers; x equals 19 for 32 I/O controllers)

High-Speed Counter

The MicroLogix 1000 high-speed counter has advanced high-speed capabilities that minimize scan time no matter how complex the program. All MicroLogix 1000 controllers that have 24V dc inputs include a built-in high-speed counter that is one of the most functional in the industry.

Features

- High-count frequency of 6.6 kHz
- Two operating modes: up count and bi-directional
- Fast Hold and Reset inputs available in either mode to enhance throughput
- True interrupt capabilities

The high-speed counter allows you to capture pulses from high-speed devices such as encoder and PHOTOSWITCH® products, independent of the controller's program scan, and energize outputs accordingly.

For detailed information on the MicroLogix 1000 high-speed counter, refer to the MicroLogix 1000 Programmable Controllers User Manual, publication 1761-6.3. To purchase this manual or download a free electronic version, visit us at http://www.theautomation bookstore.com. For fast access to related publications, visit the MicroLogix Internet site http://www.ab.com/micrologix. Electronic versions of our manuals are available for you to search and download.

Communication Choices

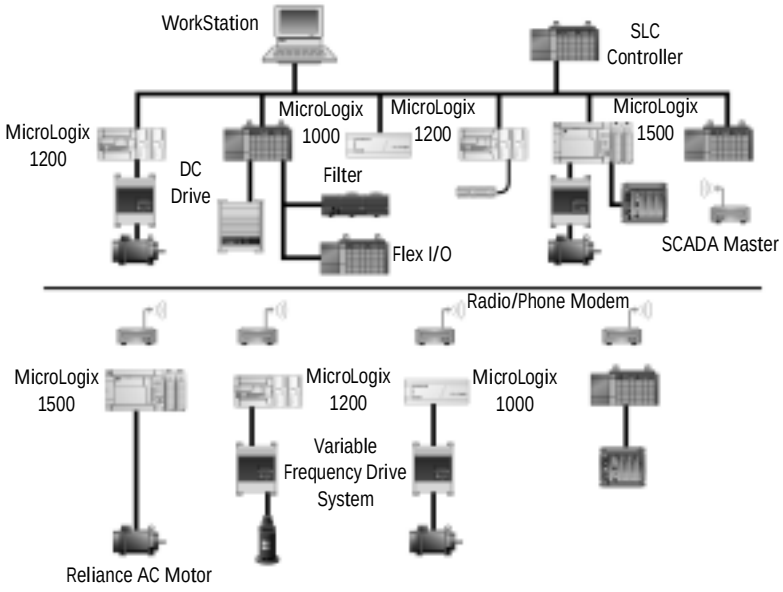
All MicroLogix 1000 programmable controllers provide several communication options to fit into a variety of applications.

The DF1 Full-Duplex protocol allows the MicroLogix 1000 to communicate directly with another device, such as a personal computer or an operator interface device. The DF1 Full-Duplex protocol (also referred to as DF1 point-to-point protocol) is useful where RS-232 point-to-point communication is required.

The DH485 multi-drop communication capability allows you to network up to 32 MicroLogix or SLC 500 controllers, Human/Machine Interface (HMI) devices and/or personal computers using peer-to-peer messaging.

MicroLogix 1000 controllers also support DF1 Half-Duplex Slave communications for use in SCADA systems as a Remote terminal Unit (RTU). This open network protocol enables MicroLogix controllers to communicate as responder (slave) nodes on DF1 master/slave networks that support up to 254 responder devices with a single initiator (master).

And, the MicroLogix 1000 can communicate on a DeviceNet network as well. DeviceNet digitally links push buttons, sensors, actuators, PLCs and other industrial devices on an open network. MicroLogix controllers on DeviceNet allow you to take advantage of the latest advances in communications. DeviceNet uses “producer/consumer” technology, a networking technology that significantly reduces the amount of traffic on the network, thus improving efficiency and data throughput.



Features:

- Standard RS-232 port
- 300; 600; 1200; 4800; 9600; 19,200 and 38,400 baud rates
- RTS/CTS Hardware handshake signals
- Connection to DH485 and DeviceNet networks
- Connection to modems for remote communications

The MicroLogix 1000 allows you to choose the network that best meets your needs.

If your application requires:	Use this network
• Connections of low-level devices directly to plant floor controllers, without the need to interface them through I/O modules • More diagnostics for improved data collection and fault detection • Less wiring and reduced start-up time than traditional, hard wired systems	DeviceNet via the 1761-NET-DNI
• Plant-wide and cell-level data sharing with program maintenance • Data sharing between controllers • Program upload, download, and monitoring to all controllers from one location • Compatibility with multiple Allen-Bradley HMI devices	DH485 via the 1761-NET-AIC
• Connection to dial-up modems for remote program maintenance or data collection • Connection to leased-line or radio modems for use in SCADA systems • Remote Terminal Unit (RTU) functions	DF1 Full-Duplex DF1 Half-Duplex Slave

Network Interface Modules

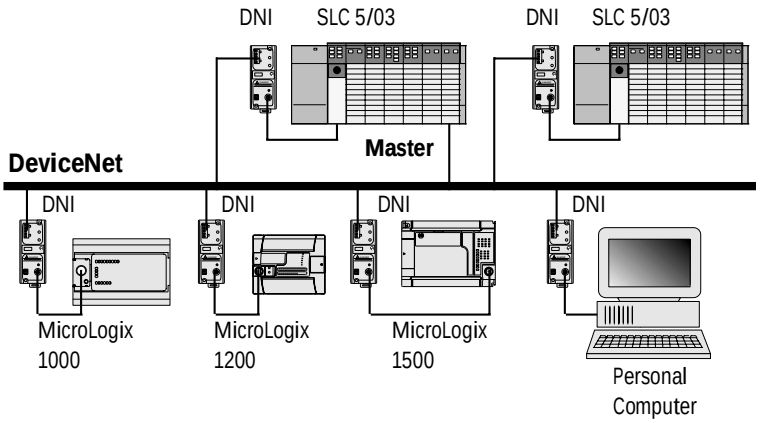
The Micrologix 1000 Programmable Controllers' list of impressive hardware, memory, and processing features makes this family of controllers the ideal choice for applications using 32 I/O or below. Additionally, the Advanced Interface Converter (AIC+) and MicroLogix 1000 controllers provide you with networking capability. And, with the DeviceNet Interface, you can connect MicroLogix Programmable Controllers and other DF1 compatible devices to a DeviceNet network.

For detailed information on using the network interface modules, refer to the AIC+ Advanced Interface Converter User Manual, publication 1761-6.4, and the DeviceNet™ Interface User Manual, publication 1761-6.5. To purchase these manuals or download a free electronic version, visit us at http://www.theautomationbookstore.com. For fast access to related publications, visit the MicroLogix Internet site http://www.ab.com/micrologix. Electronic versions of our manuals are available for you to search and download.

1761-NET-DNI DeviceNet Interface Module

Highlights of the DeviceNet Interface's capabilities are:

- Peer-to-peer messaging between Allen-Bradley controllers and other devices using the DF1 Full-Duplex protocol
- Programming and on-line monitoring over the DeviceNet network
- With a DNI connected to a modem, you can "dial in" to any other DNI-controller combination on DeviceNet
- Other DeviceNet products can send explicit (Get or Set) messages with the DNI at any time
- The controller can initiate an explicit message to any UCMM (Unconnected Message Manager) compatible device on DeviceNet



MicroLogix micro-PLCs extend the benefits of distributed control to the device level of your process with the addition of DeviceNet functionality.

DeviceNet digitally links push buttons, sensors, actuators, PLCs and other industrial devices. It reduces the installation and maintenance costs of multiple discrete wires with a single cable that handles both communications and power distribution.

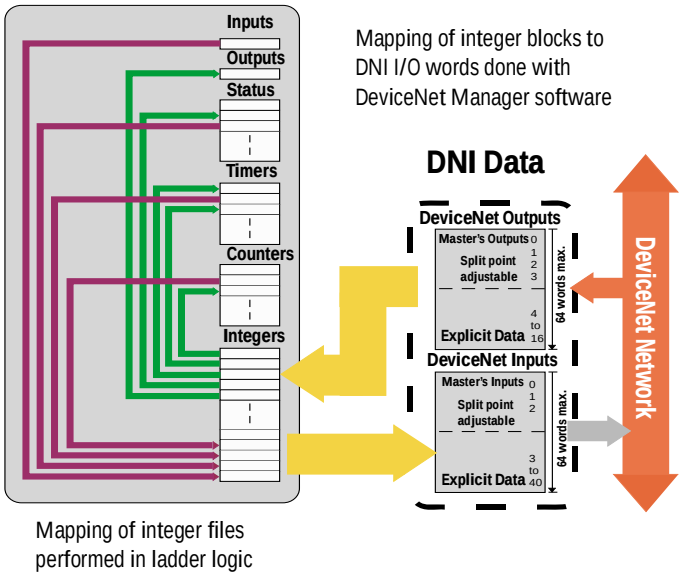
The 1761-NET-DNI Series B Interface (DNI) brings the fast response, low cost and reliability of open DeviceNet connectivity to all MicroLogix controllers and most other Allen-Bradley controllers.

Advanced Slave I/O Functionality

Through the DNI, MicroLogix controllers can function as cost-effective DeviceNet slave nodes. The DNI presents to DeviceNet up to 32 words of data (16 inputs, 16 outputs, configurable). The DNI can either poll or accept data sent from the MicroLogix to keep its mapped I/O data up-to-date with the actual data in the controller, while the DNI handles all DeviceNet communications.

All local I/O remains under the MicroLogix controllers' direct control, yet can be visible to the DeviceNet master.

Using standard messaging commands, you can easily read or write data to other controllers as shown in the network diagram on page 12.



Simple, Reliable Peer-to-Peer Messaging

The DNI brings brand-new functionality to DeviceNet by enabling peer-to-peer messaging between devices that use the DF1 Full-Duplex protocol.

The DNI takes the DF1 Full-Duplex commands, wraps them in the DeviceNet protocol and sends them to the target DNI. The target DNI removes the DeviceNet information and passes the DF1 command to the end device.

This capability works between controllers, PCs and controllers, and for program up/downloading. I/O and data messages are prioritized, which minimizes I/O determinism problems typically encountered on networks that support I/O and messaging simultaneously.

Enable Your Control Strategy Now

Helpful information and free DNI configuration software are also available at http://www.ab.com/micrologix. For more on the DeviceNet standard, visit http://www.odva.org.

DeviceNet Interface Series B (1761-NET-DNI) Specifications

Description	Specifications
24V dc Power Source Requirements	11 to 25V dc
Current Draw	200 to 250 mA 400 mA maximum inrush current (30 msec, max.)
Internal Isolation	500V dc
Operating Ambient Temperature	0 to +60°C (+32 to +140°F)
Storage Temperature	-40 to +85°C (-40 to +175°F)
Agency Certification	• UL 1604 • C-UL C22.2 No. 213 • Class 1, Division 2, Groups A, B, C, D • CE compliant for all applicable directives • ODVA conformance 2.0-A12
DeviceNet	maximum number of nodes = 64 maximum length = 500m at 125 kbaud or 100m at 500 kbaud

AIC+ Advanced Interface Converter

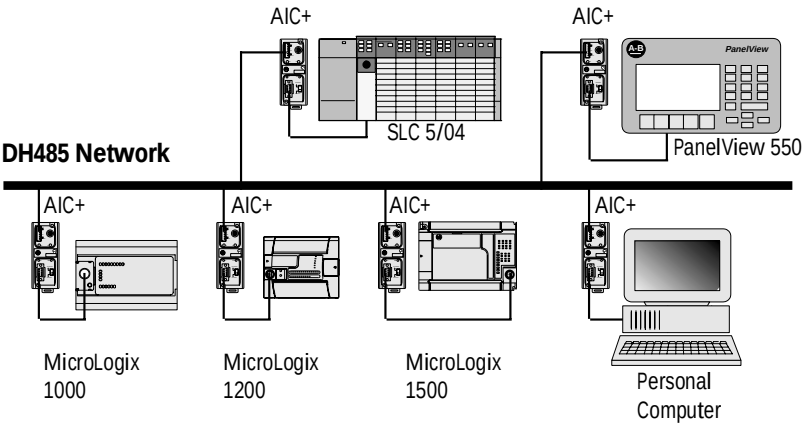
The AIC+ is a networking device from Allen-Bradley that provides DH485 network access from any DH485 compatible device that has a RS-232 port, including MicroLogix 1000, SLC 5/03 and 5/04, and PanelView 550 and 900. In addition, the device provides isolation between all ports for a more stable network and protection of connected devices. The unit is DIN rail or panel mountable and is industrially hardened.

The Advanced Interface Converter provides a simple, cost- effective solution for connecting RS-232 devices to a DH485 network. The AIC+ also provides:

- Two isolated RS-232 connections - one 9-pin D-shell and one 8-pin mini DIN
- An RS-485 6-pin Phoenix connection (Port 3)
- Accepts power via the 8-pin mini DIN from the MicroLogix 1000 controller (Port 2) or an external power connection.
- Compatibility with existing SLC DH485 networks that use 1747-AICs
- Auto baud rate capability for ease of system set-up
- Diagnostic LEDs for network activity

Some typical applications include:

- Connecting a personal computer to a DH485 network
- Connecting MicroLogix 1000 controllers to a DH485 network
- Linking SLC 5/03 or SLC 5/04 processors using DF1 Half-Duplex “master/slave” protocol. This allows you to connect remote “islands” of automation to a master controller to upload diagnostic and status information.

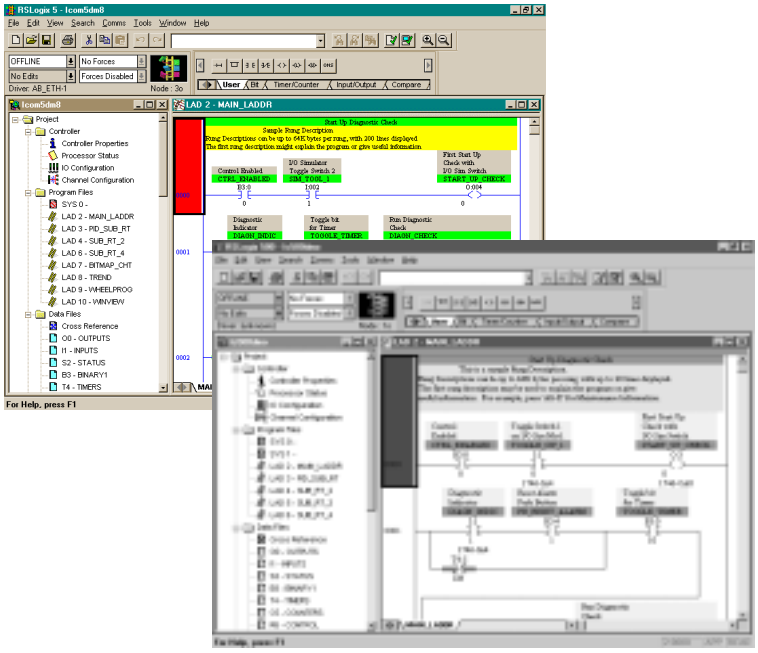


Advanced Interface Converter (1761-NET-AIC) Specifications

Description	Specifications
24V dc Power Source Requirement	20.4 - 28.8V dc
Current Draw	120 mA 200 mA maximum inrush current
Internal Isolation	500V dc
Operating Ambient Temperature	0 to +60°C (+32 to +140°F)
Storage Temperature	-40 to +85°C (-40 to +175°F)
Agency Certification	• UL 508 • CSA C22.2 • CE compliant for all applicable directives
DH485, DF1, or “user” Network	maximum number of nodes = 32 per multidrop network maximum length = 1,219m (4,000 ft.) per multidrop network maximum number of “ganged” multidrop networks = 2

Programming Options

The following sections describe programming options available for the MicroLogix 1000 controllers. With RSLogix 500™ Programming Software, you can create, modify, and monitor application programs used by both the SLC 500 and MicroLogix 1000 Programmable Controller families. Use the Hand-Held Programmer to perform all programming functions including monitoring application programs used by your controller.



RSLogix 500 Programming Software

The RSLogix 500 ladder logic programming package helps you maximize performance, save project development time, and improve productivity. This product has been developed to operate on Microsoft's 32-bit, Windows® 95, Windows® 98, and Windows NT™ operating systems. Supporting Allen-Bradley's SLC 500 and MicroLogix families of processors, RSLogix 500 was the first PLC programming software to offer unbeatable productivity with an industry-leading user interface.

RSLogix 500 programming packages are compatible with programs created with Rockwell Software's DOS-based programming packages for the SLC 500 and MicroLogix families of processors, making program maintenance across hardware platforms convenient and easy.

Flexible, Easy-to-Use Editors

Flexible program editors let you create application programs without worrying about getting the syntax correct as you create your program. A *Project Verifier* builds a list of errors that you can navigate to make corrections at your convenience.

Powerful online editing features let you modify your application program while the process is still operating. The *Test Edits* feature allows you to test the operation of your modification before it becomes a permanent part of the application program. Online and offline editing sessions are limited only by the amount of available RAM.

Projects developed with Rockwell Software's DOS programming packages, SLC 500 and MicroLogix A.I. Series, APS and MPS, can be moved to the RSLogix environment simply by opening the existing project with the appropriate RSLogix package.

Drag-and-drop editing lets you quickly move or copy instructions from rung to rung within a project, rungs from one subroutine or project to another, or data table elements from one data file to another.

Context menus for common software tools are quickly accessible by clicking the right mouse button on addresses, symbols, instructions, rungs, or other application objects. This convenience provides you with all the necessary functionality to accomplish a task within a single menu.

Point-and-Click I/O Configuration

The easy-to-use I/O Configurator lets you click or drag-and-drop a module from an all-inclusive list to assign it a slot in your configuration. Advanced configuration, required for specialty and analog modules, is easily accessible. Convenient forms speed entry of configuration data. An I/O auto configuration feature is also available.

Powerful Database Editor

Use the *Symbol Group Editor* to build and classify groups of symbols so that you can easily select portions of your recorded documentation to be used from project to project.

Use the *Symbol Picker* list to easily address instructions in your ladder logic by clicking addresses or symbols to assign them to your ladder instructions.

Diagnostics and Troubleshooting Tools

Simultaneously examine the status of bits, timers, counters, inputs, and outputs all in one window with the *Custom Data Monito*r. Each application project you create can have its own *Custom Data Monitor* window.

Easily review status bit settings specific to your application programming including *Scan Time* information, *Math Register* information, Interrupt settings and more with the tabbed *Status* displays.

Selection Chart

Catalog Number	Description
9324-RL0300ENE(1) (2)	RSLogix 500 Programming for the SLC 500 and MicroLogix Families on CD-ROM. Includes RSLinx Lite.
9324-RL0100ENE(1) (2)	RSLogix 500 Starter Programming for the SLC 500 and MicroLogix Families on CD-ROM. This package is a functionally limited version of RSLogix 500.
Programming Cables	See page 20 for information on MicroLogix 1000 programming cables.

(1) To use RSLogix 500 programming software, your system must be a Pentium 100 MHz or higher, Windows® 95, Windows® 98, or Windows NT™.
(2) Also available in Spanish, German, French, Italian, and Portuguese.

MicroLogix 1000 Hand-Held Programmer

The MicroLogix 1000 Hand-Held Programmer (HHP) allows you to create, edit, monitor, and troubleshoot Instruction List (Boolean) programs for your micro controller. With the HHP and either a 10-, 16-, or 32-I/O point or analog micro controller, you eliminate the need for hard-wired relay logic. This device also allows you to transfer programs to and from an optional removable memory module.

Programming Instructions

MicroLogix has the range of functionality necessary to address diverse applications, with 12 basic logic instructions, 43 applied control instructions, and 14 advanced application-specific instructions.

Your controller uses the following types of instructions:

- Basic Instructions
- Comparison Instructions
- Data Instructions
- Communications Instructions
- Math Instructions
- Program Flow Control Instructions
- Application Specific Instructions
- High-Speed Counter Instruction

Basic Instructions

These instructions represent hardwired logic circuits used for the control of a machine.

Count Up/Count Down
Examine if Closed
Examine if Open
One Shot Rising
Output Energize
Output Latch/Output Unlatch
Reset
Retentive On-delay Timer
Timer On/Timer Off-Delay

Comparison Instructions

These instructions are used to test pairs of values to condition the logical continuity of a rung.

Equal
Greater Than
Greater Than or Equal
Less Than
Less Than or Equal
Limit Test
Masked Comparison for Equal
Not Equal

Data Handling Instructions

These instructions convert information, manipulate data in the controller, and perform logic operations.

And
Convert to BCD
Convert from BCD
Copy File
Decode
Encode
Exclusive Or
Fill File
Load/Unload First In Last Out
Load/Unload Last In First Out
Masked Move
Move
Negate
Not
Or

Communications Instructions

This instruction allows data to be read/written to other devices.

Message

Math Instructions

These instructions take two input values, perform the specified arithmetic functions, and output the result to an assigned memory location.

Add/Subtract

Multiply/Divide

Clear

Double Divide

Scale Data

Square Root

Program Flow Control Instructions

These instructions control the sequence in which your program is executed.

Label

Immediate Input with Mask

Immediate Output with Mask

Jump

Jump to Subroutine

Master Control Reset

Subroutine

Suspend

Temporary End

Application Specific Instructions

These instructions allow you to use a single instruction or pair of instructions to perform common complex operations.

Bit Shift Right/Bit Shift Left

Interrupt Subroutine

Selectable Timer Interrupt Enable/Disable

Selectable Timer Interrupt Start

Sequencer Output/Sequencer Compare

High-Speed Counter Instructions

These instructions configure, control, and monitor the controller's hardware counter.

High-Speed Counter

High-Speed Counter Enable/Disable

High-Speed Counter Load

High-Speed Counter Reset

High-Speed Counter Reset Accumulator

Update High-Speed Counter Image Accumulator

For detailed information on the MicroLogix 1000 programming instructions, refer to the MicroLogix 1000 Programmable Controllers User Manual, publication 1761-6.3. To purchase this manual or download a free electronic version, visit us at http://www.theautomation bookstore.com. For fast access to related publications, visit the MicroLogix Internet site http://www.ab.com/micrologix. Electronic versions of our manuals are available for you to search and download.

Operator Interface Devices

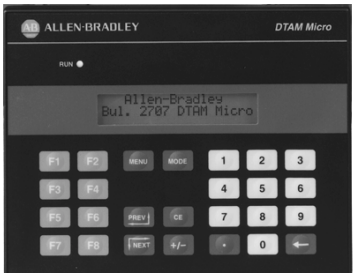
Operator interface devices provide you with powerful plant floor control and data monitoring capabilities.

MicroView™ Operator Interface

The MicroView Operator Interface is a feature-packed, cost effective operator interface designed for data monitoring, data display, and data entry. This device features a 2-line x 16-character display window.

DTAM™ Micro Operator Interface

The DTAM Micro Operator interface provides another operator interface to the MicroLogix line. DTAM Micro is a low-cost operator interface. This device features a 2-line x 20-character display window. Up to 244 application screens can be stored in memory.



DTAM™ Plus Operator Interface

The DTAM Plus Operator Interface provides a highly functional operator interface for the MicroLogix 1000 family of processors. This device features a 4-line x 20-character display window for viewing data table information and operator prompts. Display screens are created using an Offline Development software Package.

PanelView™ Operator Terminals

PanelView Operator Terminals provide operator interface capabilities in space saving, flat panel designs or 14-inch CRTs. These electronic operator interfaces feature pixel graphics and high performance functionality in color and monochrome flat panel displays, as well as Super VGA CRTs with optimum viewing angles and resolution. PanelView terminals provide extensive diagnostic information to operators during fault conditions through message windows, alarm windows, and simple graphics.

Accessories

Cables

Use the communication cables listed below with MicroLogix 1000 controllers. Cables come in several lengths and connector styles to provide connectivity to the MicroLogix line.

Catalog Number	Cable Type	Description
1761-CBL-AC00	9-pin D-shell to 9-pin D-shell	This 45 cm (17.7 in.) cable is used to connect port 1 of the 1761-NET-AIC to the 9-Pin DTE port of a personal computer.
1747-CP3	9-pin D-shell to 9-pin D-shell	This 3m (9.8 ft) cable is used to connect port 1 of the 1761-NET-AIC to the 9-Pin DTE port of a personal computer.
1761-CBL-AM00	8-pin DIN to 8-pin DIN	This 45 cm (17.7 in.) cable is used to connect the MicroLogix controller to port 2 of the 1761-NET-AIC
1761-CBL-HM02	8-pin DIN to 8-pin DIN	This 2m (6.56 ft) cable is used to connect the MicroLogix 1000 Programmable Controller to the HHP or to connect any MicroLogix Programmable Controller to port 2 of the 1761-NET-AIC
1761-CBL-AP00	9-pin D-shell to 8-pin DIN	This 45 cm (17.7 in.) cable is used to connect a MicroLogix controller to port 1 of the 1761-NET-AIC.
1761-CBL-PM02	9-pin D-shell to 8-pin DIN	This 2m (6.56 ft) cable is used to connect the MicroLogix Programmable Controller to an IBM compatible PC or to connect an IBM compatible PC to port 2 of the 1761-NET-AIC
1761-CBL-AS03	6-pin phoenix to RJ45	This 3m (9.8 ft) cable is used to connect the SLC 500 fixed, SLC 5/01, SLC 5/02, and SLC 5/03 processor RJ45 port to the 6-Pin Phoenix Connector (port 3) of the 1761-NET-AIC Advanced Interface Converter.
1761-CBL-AS09	6-pin phoenix to RJ45	This 3m (9.8 ft) cable is used to connect the SLC 500 fixed, SLC 5/01, SLC 5/02, and SLC 5/03 processor RJ45 port to the 6-Pin Phoenix Connector (port 3) of the 1761-NET-AIC Advanced Interface Converter.

User Documentation

For an introduction to micro PLC's refer to the MicroMentor™, publication 1761-MMB. The MicroMentor book includes illustrations, sample applications you can put to immediate use, step-by-step strategies, and worksheets.

Additionally, MicroLogix 1000 user documentation presents information according to the tasks you perform and the programming environment you use. Refer to the table below for information on MicroLogix 1000 publications.

Title	Publication Number
MicroLogix™ 1000 Programmable Controllers Installation Instructions	1761-5.1.2
AIC+ Advanced Interface Converter and DeviceNet™ Interface Installation instructions	1761-5.11
MicroLogix™ 1000 Programmable Controllers User Manual	1761-6.3
MicroLogix™ 1000 with Hand-Held Programmer (HHP) User Manual	1761-6.2
AIC+ Advanced Interface Converter User Manual	1761-6.4
DeviceNet™ Interface User Manual	1761-6.5
DTAM™ Micro Operator Interface Module User Manual	2707-803
MicroView™ Operator Interface Module User Manual	2707-805
DataDisc™ CD-ROM Information Library	1795-CDRS and 1795-CDRL

For assistance selecting the correct MicroLogix Programmable Controller for your application, see the MicroLogix selector guide on the back of this publication. If you would like a system overview for the MicroLogix 1200 or MicroLogix 1500 controllers, refer to the following table.

See this Document	Publication Number
MicroLogix™ 1200 System Overview	1762-SO001A-US-P
MicroLogix™ 1500 System Overview	1764-SO001A-US-P

To purchase a manual or download a free electronic version, visit us at http://www.theautomation bookstore.com. For fast access to Bulletin 1761, 1762, and 1764 publications, visit the MicroLogix Internet site http://www.ab.com/micrologix. Electronic versions of our manuals are available for you to search and download.

Wiring Diagrams

The following pages show the MicroLogix 1000 wiring diagrams.

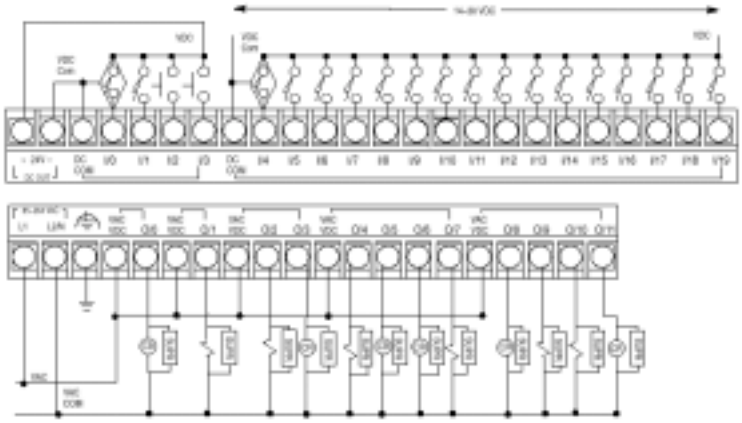
Sinking and Sourcing

Any of the controllers with dc inputs can be wired as either *sinking* or *sourcing* configurations depending on how the DC COM is wired.

Sinking and Sourcing Wiring Examples

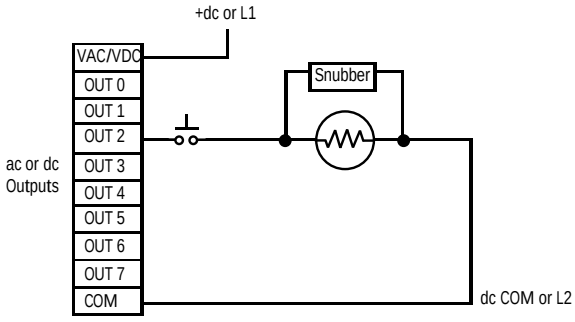
Note that the 1761-L32BWA wiring diagrams below also apply to 1761-L10BWA, -L10BWB, -L16BWA, -L16BWB, -L16BBB, -L20BWA-5A, -L20BWB-5A, -L32BWB, -L32BBB.

1761-L32BWA



Surge Suppression

We recommend surge suppressors across *all* inductive outputs.



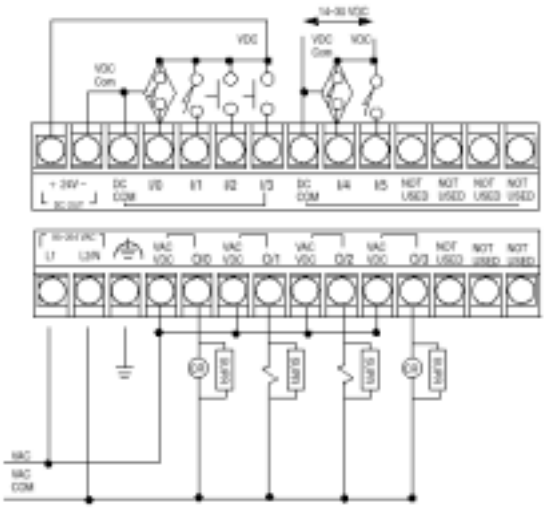
By adding a suppression device directly across the coil of an inductive device, you will reduce the effects of voltage transients caused by interrupting the current to that inductive device, and will prevent electrical noise from radiating into system wiring.

For more detailed surge suppression information, as well as a listing of recommended Allen-Bradley surge suppressors, see the MicroLogix 1000 Programmable Controllers User Manual, publication 1761-6.3.

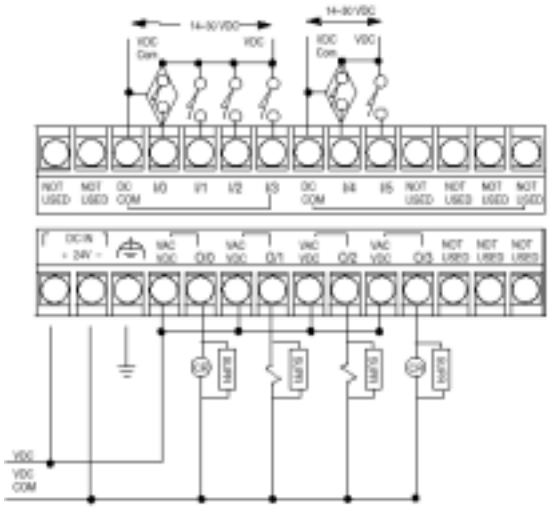
MicroLogix 1000 Wiring Diagrams

IMPORTANT This symbol denotes a functional earth ground terminal which provides a low impedance path between electrical circuits and earth for non-safety purposes, such as noise immunity improvement.

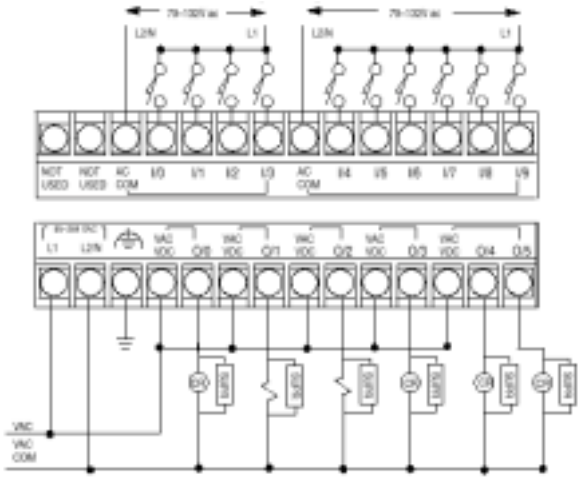
1761-L10BWA (Sinking Input Configuration)



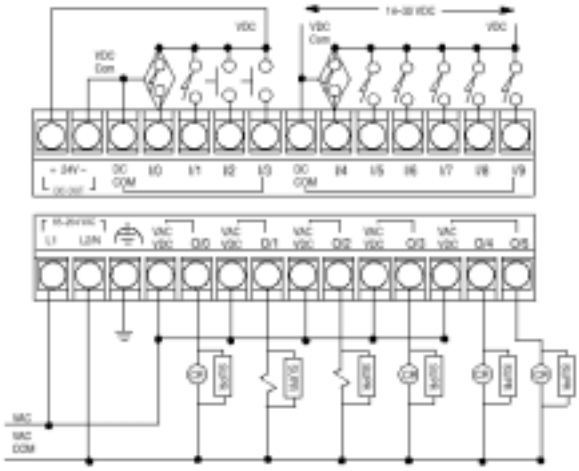
1761-L10BWB (Sinking Input Configuration)



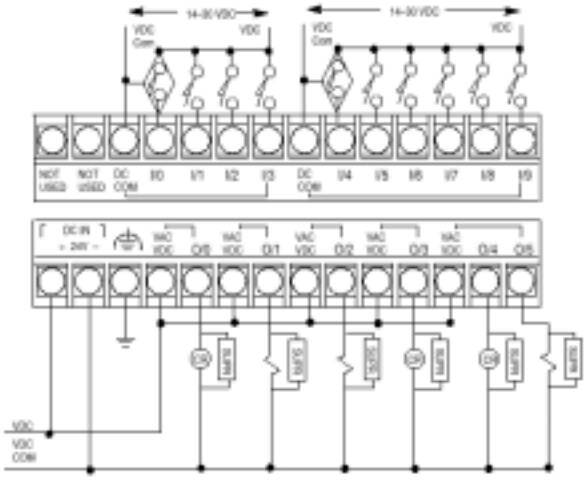
1761-L16AWA Wiring Diagram



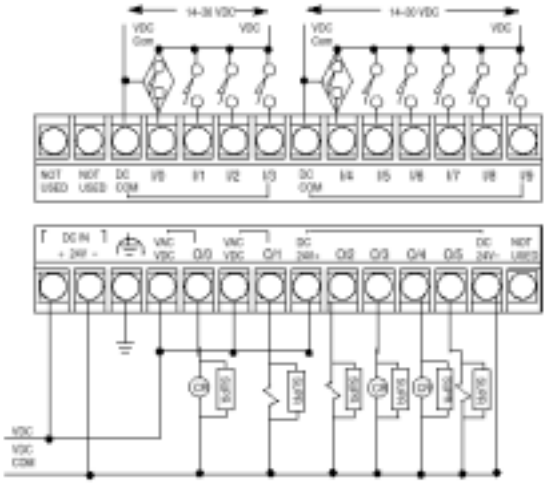
1761-L16BWA (Sinking Input Configuration)



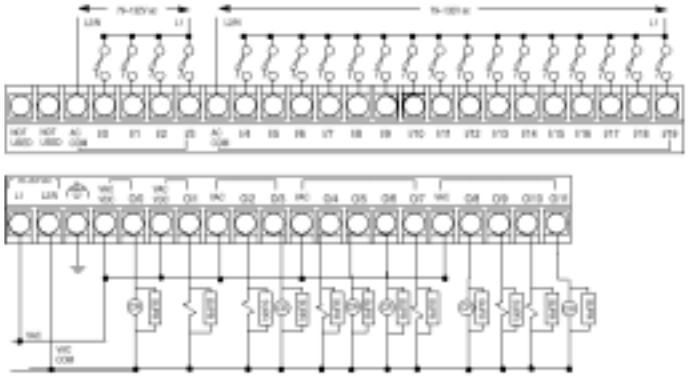
1761-L16BWB (Sinking Input Configuration)



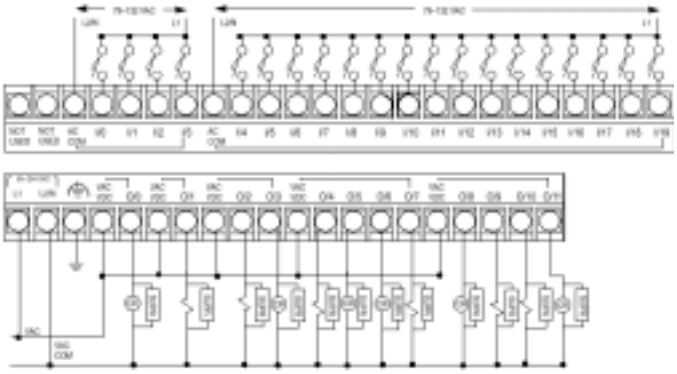
1761-L16BBB (Sinking Input Configuration)



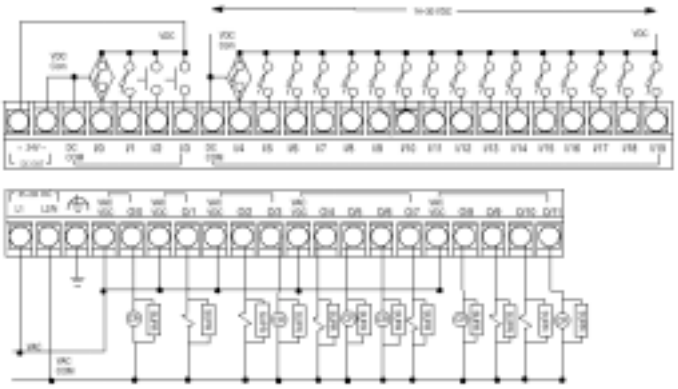
1761-L32AAA



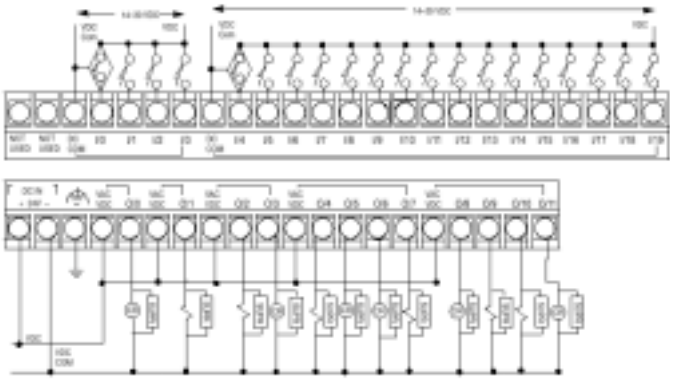
1761-L32AWA



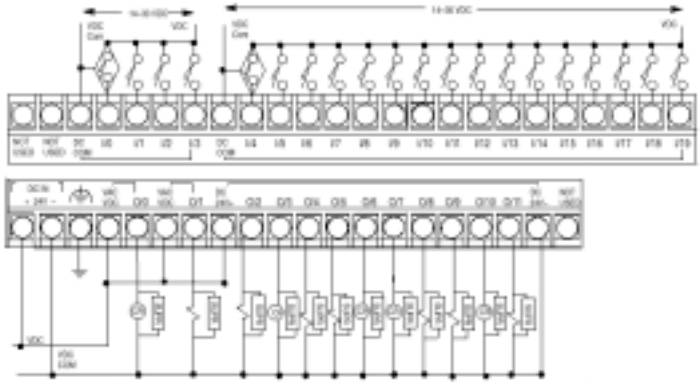
1761-L32BWA (Sinking Input Configuration)



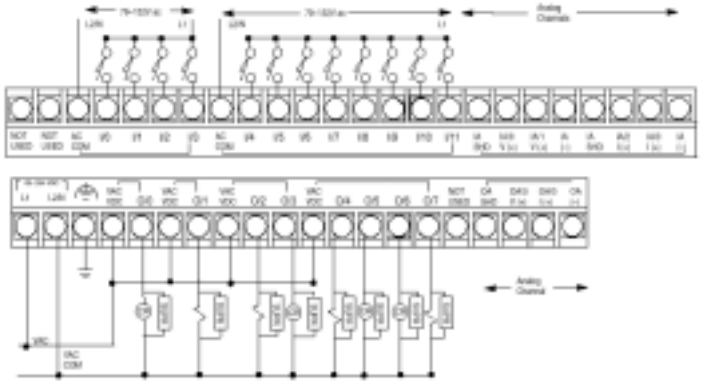
1761-L32BWB (Sinking Input Configuration)



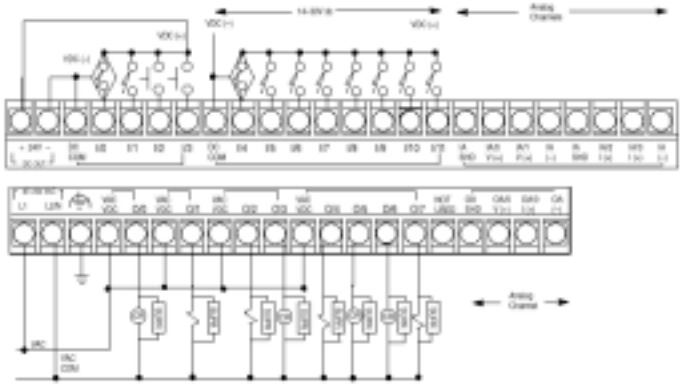
1761-L32BBB (Sinking Input Configuration)



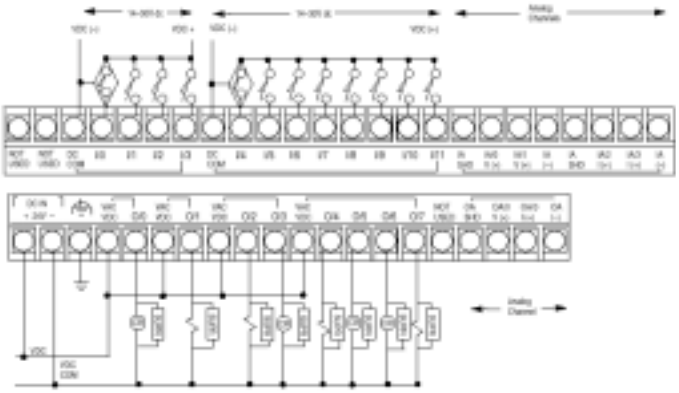
1761-L20AWA-5A



1761-L20BWA-5A (Sinking Input Configuration)



1761-L20BWB-5A (Sinking Input Configuration)

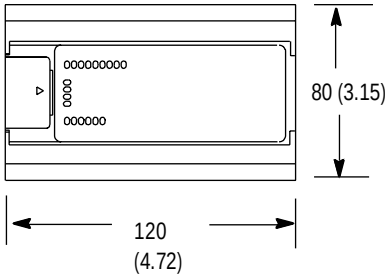


Dimensions

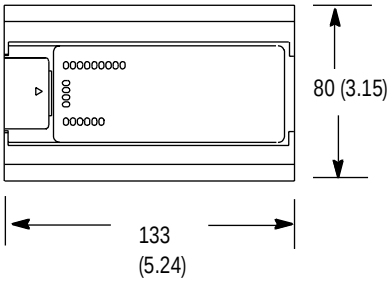
Dimension Drawings

Dimensions are in millimeters (inches).

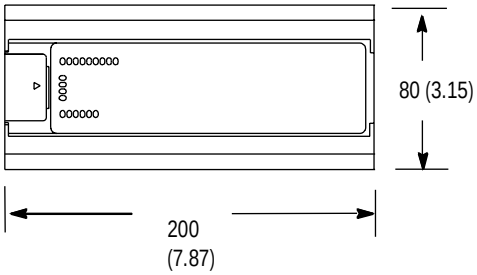
1761-L10BWA, -L10BWB, -L16BWA, -L16BWB, -L16BBB



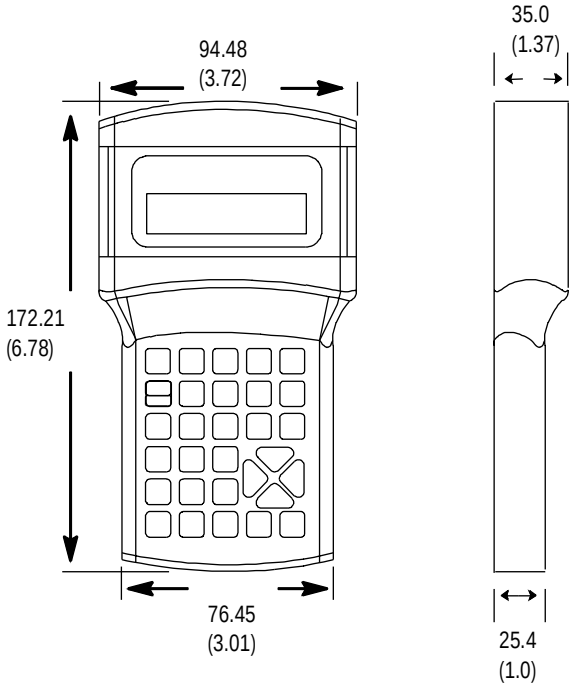
1761-L16AWA



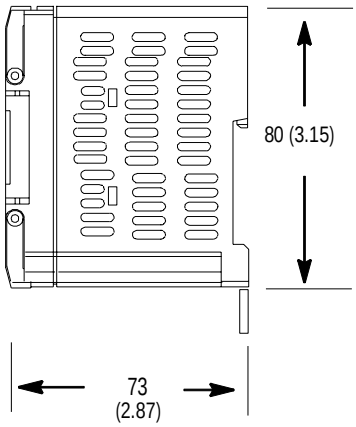
1761-L20AWA, -L20BWA, -L20BWB, -L32AWA, -L32BWA, -L32BWB, -L32AAA, -L32BBB



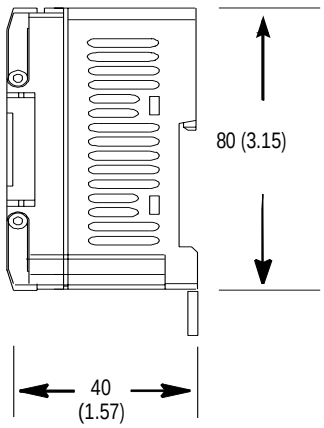
MicroLogix 1000 Hand-Held Programmer



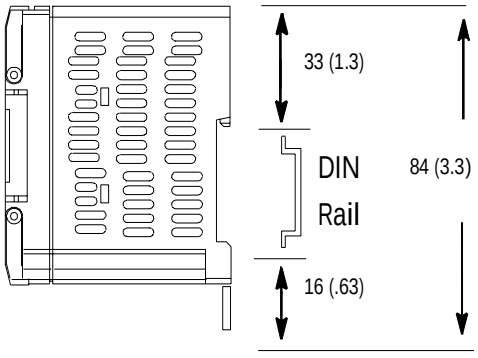
1761-L10BWA, -L16AWA, -L16BWA, -L20AWA, -L20BWA, -L32AWA, -L32BWA, -L32AAA



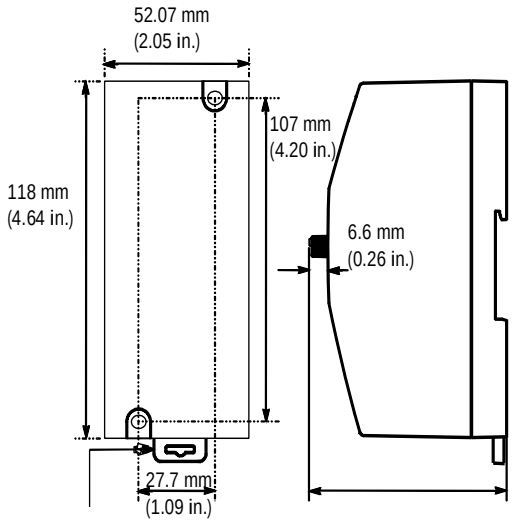
1761-L10BWB, -L16BWB, -L16BBB, -L20BWB, -L32BWB, -L32BBB



MicroLogix 1000 DIN Rail Dimensions

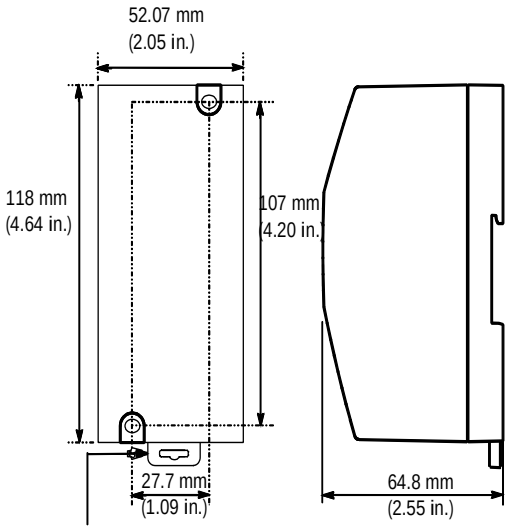


Advanced Interface Converter (AIC+)



Allow 15 mm (0.6 in) for DIN rail latch movement during installation and removal.

DeviceNet Interface (DNI)



Allow 15 mm (0.6 in) for DIN rail latch movement during installation and removal.

Notes